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# (12) UK Patent Application (19) GB (11) 2 355 198 (13) A

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(56) Documents Cited  
**GB 2078522 A WO 99/57980 A1 WO 94/18297 A1**  
**WO 86/05401 A1 US 5015408 A US 4459217 A**  
**US 3671629 A**  
**WPI Abstract Accession No 1995-253098/50 &**  
**RU 2025131 C1**

(58) Field of Search  
**Online: EPODOC, JAPIO, WPI**

(54) Abstract Title  
**An aldehyde-free sterilant and disinfectant based on a peroxide source in powder or kit form for mixing and/or diluting**

(57) A formulation is provided as a concentrate for producing a biocidally active solution. The formulation comprises a water soluble oxidant generator-peroxide source (eg hydrogen peroxide, sodium perborate or potassium peroxy monosulphate) and is in the form of:  
either a single-pack powder that is diluted and dissolved to produce the biocidally active solution  
or a twin-pack liquid or liquid-and-solid formulation which (when the components are mixed or are diluted, mixed and dissolved) provide the biocidally active solution.

The formulation may optionally comprise a buffer (eg citric acid), an oxidant stable surfactant, a metal sequesterant (eg ethylenediamine tetramethylphosphonate), a peroxide reactant/trigger, a corrosion inhibitor, a colour, a perfume or an indicator which improves effective hygiene performance.

Tetraacetyl ethylene diamine (TAED) may be included as a potentiating ingredient which, under slightly alkali conditions of a buffered solution, is activated to produce a very effective low temperature biocide, by reacting with peroxide anions to produce peracetic anions.

This combination of hydrogen peroxide, peracetic acid and peracetic anions is synergistic and produces a rapidly biocidal and sporicidal solution with a very broad spectrum of activity. It may be used as a sterilant/sanitiser in medical, veterinary and food establishments (eg sterilising medical and dental instruments).

GB 2 355 198 A

## **An Aldehyde-Free Sterilant and Disinfectant**

A powder or liquid formulation produced as a concentrate which is diluted with water to produce an aldehyde-free solution to clean, disinfect and sterilise medical instruments.

### **Background of the Invention**

Medical, dental and other instruments are often made of high quality stainless steel and can be cleaned and sterilised between uses by high temperature steam under pressure. In contrast to this many instruments are made of heat-sensitive plastics, rubber, glass and electronic components. For this reason, heat sensitive instruments can only be sterilised by cold chemical germicides. Chemical sterilants presently available have many ethical and toxicological difficulties. The disclosed formula does not.

### **Details of the Invention**

The formulation provides a method of providing hydrogen peroxide, peracetic acid and peracetic anions in solution. The formulation can be a single pack powder that is simply diluted with water at the designated concentration and dissolved to provide the activated working solution. Or is a twin pack liquid, or liquid and solid formulation which when the components are mixed or diluted and mixed and dissolved provide an activated working solution. The resultant solution is a very powerful disinfectant and sterilising liquid with a combination of actives which because of the hurdle principle reduce the risk of the formation of resistant bacteria.

The resultant antimicrobial activity of the resultant solution is affected by pH - the greatest activity is under slightly alkali conditions pH 7-8.5. This pH has shown to be ideal for the protonated solution to move across the cytoplasmic membrane of a cell and cause disruption and death.

The potentiating ingredient in the formulation is tetra acetic ethylene diamine (T.A.E.D.) which, under the slightly alkali conditions of the buffered solution, is activated to produce a very effective low temperature biocide. Under such conditions one mole of TAED reacts with two moles of peroxide anion to produce two moles of peracetic anion.

The components of the system are TAED, a peroxide source (hydrogen peroxide, sodium perborate, potassium peroxy monosulphate) and a buffer complex. A sequesterant stabiliser - ethylene diamine tetra methyl phosphonate.

#### **Typical Formulation**

	<b>Preferred</b>	<b>Possible</b>
TAED	27%	10-60%
Sodium Perborate	46%	20-70%
Citric Acid	25%	10-50%
EDTMPA	0.5%	0.1-5%
Surfactant	1.5%	0-10%

A powder or liquid formulation which is a combination of peracids and a perborate generating peroxide which produces a synergistic interaction of constituents when in solution. The active ingredient is a stabilised solid or stabilised liquid form of hydrogen peroxide. The concentrated formula contains a buffered trigger that on dilution produces a combination of peracetic acid and peracetic anions at an alkali pH.

This combination of hydrogen peroxide, peracetic acid and peracetic anions is far more biocidal than the individual ingredient in isolation. The synergistic formulation produces a rapidly biocidal and sporicidal solution with a very broad spectrum of activity.

**Ideal for use as a sterilant/sanitiser in medical, veterinary and food establishments.**

**Claims:**

1. A formulation which is a dry powder, a powder and liquid, or a liquid and liquid which when combined and or diluted produce a biocidally active solution which comprises of, but not limited to a water soluble oxidant generator- peroxide source.
2. A formulation as claimed in claim 1 and further comprising a buffer or buffers.
3. A formulation according to claim 1 or claim 2 and further comprising an oxidant stable surfactant or surfactants.
4. A formulation according to any preceding claim and further comprising a metal sequesterant or sequesterants.
5. A formulation according to any preceding claim and further comprising a peroxide reactant/trigger or triggers.
6. A formulation according to any preceding claim and further comprising a corrosion inhibitor or inhibitors.
7. A formulation according to any preceding claim and further comprising a colour, perfume or indicator which improves effective hygiene performance.



**Application No:** GB 9910514.0  
**Claims searched:** 1-7

**Examiner:** Stephen Quick  
**Date of search:** 7 February 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S):

Int Cl (Ed.7):

Other: Online: EPODOC, JAPIO, WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2078522 A (ANTEC AH INTERNATIONAL), see especially page 1 lines 86-89 and example 3	1 & 3
A,E	WO 99/57980 A1 (OXYSTER SNC DI SKEPETARIS), see especially page 2, lines 6-20	-
X	WO 94/18297 A1 (WARWICK INTERNATIONAL GROUP), see for example pages 17 (lines 35-36), 24 (lines 18-31) & 37 (lines 26-30)	1 at least
X	WO 86/05401 A1 (DEWENTSIDE LABORATORIES), see especially examples 5-9	1, 3 & 4
X	US 5015408 A (RECKITT), see especially column 6 lines 26-48 and the powder precursor at column 6 line 46	1-5 & 7
X	US 4459217 A (RECKITT & COLMAN PRODUCTS), see fine powder at column 4, lines 47-51	1
X	US 3671629 A (RICHARDSON-MERRELL), see especially column 2 line 45 to column 3 line 5	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



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Category	Identity of document and relevant passage	Relevant to claims
X	WPI Abstract Accession No 1995-253098/50 & RU 2025131 C1 (PROPHYLACTICS TOXICOLOGY & DISENFECTION), see peroxide containing white powder in abstract	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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